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Kaushal, Sumesh Monday, November 04, 2002 2:34 PM

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09/755633: Interference and Sequence/Oligo Search

## 09/755633: Interference and Sequence/Oligo Search

Title: CANINE AND FELINE IMMUNOREGULATORY PROTEINS, NUCLEIC ACID MOLECULES,

AND USES THEREOF Inventor: YANG, SHUMIN

SEQ ID NO: 4, 6, 7, 8, 9, 11, 18 and 19

- + Oligo search for SEQ ID NO: 4, 6, 7, 8, 9, 11, 18 and 19
- SEQ ID NO: 5 and 10 (PRT).

Prioriy Date: 5/29/1998

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S. Kaushal CM1 12A07 AU1636

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☐ 1: J Interferon Cytokine Res 2000 Sep;20(9):779-85

Related Articles, Links

Canine interleukin-13: molecular cloning of full-length cDNA and expression of biologically active recombinant protein.

Yang S, Boroughs KL, McDermott MJ.

Heska Corporation, Fort Collins, CO 80525, USA. shumin.yang@maxygen.com

Interleukin-13 (IL-13) regulates immune responses mediated by type 2 T helper lymphocytes (Th2) in the human and mouse. To study the function of this cytokine in the dog, we have isolated a cDNA that encodes the full-length canine IL-13 (CaIL-13) precursor polypeptide of 131 amino acids. CaIL-13 shares significant homology with the IL-13 amino acid sequences of cattle (54.1%), mouse (39.6%), and rat (36.6%) but shares the highest identity with human IL-13 (HuIL-13) (61.8%). The predicted CaIL-13 mature polypeptide of 111 residues was expressed in bacteria, and recombinant CaIL-13 (rCaIL-13) was isolated from inclusion bodies and refolded. rCaIL-13 stimulated the proliferation of TF-1 cells, which are derived from human erythroleukemia cells and respond to IL-13 as well as to a number of other human and murine cytokines. CaIL-13 mRNA was readily detectable by reverse transcriptase-polymerase chain reaction (RT-PCR) in cells from lymph nodes and peripheral blood. The gene sequence and biologically active recombinant protein for CaIL-13 will be useful reagents to determine the role of IL-13 in the regulation of canine immune responses.

PMID: 11032397 [PubMed - indexed for MEDLINE]

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1: Growth Factors 1993;8(2):87-97

Related Articles, Links

### A model for the interaction of the GM-CSF, IL-3 and IL-5 receptors with their ligands.

Goodall GJ, Bagley CJ, Vadas MA, Lopez AF.

Hanson Centre for Cancer Research, Division of Human Immunology, Institute of Medical and Veterinary Science, Adelaide, South Australia.

The high affinity receptors for GM-CSF, IL-3 and IL-5 are heterodimers consisting of a ligandspecific alpha chain and a common beta chain. These proteins are members of a family of proteins known as the "cytokine receptor family" which is characterized by the presence of a 200-residue ligand-binding module. The GM-CSF, IL-3 and IL-5 receptor alpha chains constitute a distinct subgroup and share features not found in other members of the cytokine receptor family, features which we propose to be important for their interaction with the common beta chain and for their binding of the structurally-related ligands. The growth hormone receptor is a well-characterized member of the cytokine receptor family. Based on the structure of the complex between growth hormone and its receptor, we have proposed sites of contact between the GM-CSF, IL-3 and IL-5 receptors and their cognate ligands.

#### Publication Types:

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i i i i i i i i i i i i i i i i i i i	ion of Biochemistry and Malian National University, ale first time, allergic disease not be that T helper type 2 disease. In this article, we will receive and their receptors, and and experimental asthropmental challenges, but on the health concerns. Copyrigination Types:  Review  Review, Tutorial	ion of Biochemistry and Molecular Biology, John alian National University, Canberra, ACT 0200 A see first time, allergic diseases have emerged as made of the first time, allergic disease now exist, but are plagued icant minority of patients remains unresponsive. So ished that T helper type 2 (T(H)2) cytokines contained the transpective strategies that target the key T(H)2 cytokie. In this article, we will review the biology of the case. In this article, we will review the biology of the case and their receptors, and will consider several man and experimental asthma. While promising, represented the concerns. Copyright 2002 Elsevier Science the total concerns. Copyright 2002 Elsevier Science action Types:	Review Review, Tutorial

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**1:** EMBO J 1994 Nov 1;13(21):5176-85

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Three residues in the common beta chain of the human GM-CSF, IL-3 and IL-5 receptors are essential for GM-CSF and IL-5 but not IL-3 high affinity binding and interact with Glu21 of GM-CSF.

Woodcock JM, Zacharakis B, Plaetinck G, Bagley CJ, Qiyu S, Hercus TR, Tavernier J, Lopez AF.

Division of Human Immunology, Hanson Centre for Cancer Research, Institute of Medical and Veterinary Science, Adelaide, South Australia.

The beta subunit (beta c) of the receptors for human granulocyte macrophage colony stimulating factor (GM-CSF), interleukin-3 (IL-3) and interleukin-5 (IL-5) is essential for high affinity ligandbinding and signal transduction. An important feature of this subunit is its common nature, being able to interact with GM-CSF, IL-3 and IL-5. Analogous common subunits have also been identified in other receptor systems including gp130 and the IL-2 receptor gamma subunit. It is not clear how common receptor subunits bind multiple ligands. We have used site-directed mutagenesis and binding assays with radiolabelled GM-CSF, IL-3 and IL-5 to identify residues in the beta c subunit involved in affinity conversion for each ligand. Alanine substitutions in the region Tyr365-Ile368 in beta c showed that Tyr365, His367 and Ile368 were required for GM-CSF and IL-5 high affinity binding, whereas Glu366 was unimportant. In contrast, alanine substitutions of these residues only marginally reduced the conversion of IL-3 binding to high affinity by beta c. To identify likely contact points in GM-CSF involved in binding to the 365-368 beta c region we used the GM-CSF mutant eco E21R which is unable to interact with wild-type beta c whilst retaining full GM-CSF receptor alpha chain binding. Eco E21R exhibited greater binding affinity to receptor alpha beta complexes composed of mutant beta chains Y365A, H367A and I368A than to those composed of wild-type beta c or mutant E366A. These results (i) identify the residues Tyr365, His367 and Ile368 as critical for affinity conversion by beta c. (ii) show that high affinity binding of GM-CSF and IL-5 can be dissociated from IL-3 and (iii) suggest that Tyr365, His367 and Ile368 in beta c interact with Glu21 of GM-CSF.

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             AF331919
                                        610 bp
                                                  mRNA
                                                          linear
                                                                    MAM 04-OCT-2001
DEFINITION
             Canis familiari: interloukin-5 mRNA, complete cds.
ACCESSION
            AF331919
             AF331919.1 GI:15919180
VERSION
KEYWORDS
SOURCE
             Canis familiari: (dog)
  OF CALLSM
             lanis familiari.
             Eukaryota; Metacoa; Chordata; Craniata; Vertebrata; Euteleostomi;
            Mammalia; Euthe:ia; Carnivora; Fissipedia; Canidae; Canis.
REFERENCE
             ! (bases 1 to r10)
  AUTHORS
             Yang, S., Bellin, K.B., Weber, E. and McCall, C.
  TITLE
            Carrine interleusin-5: molecular characterization of the gene and
             expression of biologically active recombinant protein
  JCUFNAL
             . Interferon Cytokine Res. 21 (6), 361-367 (2001)
  MEILINE
            13344
   EUEMED
              144763
F.E.F.E.F.C.E
              (bases 1 to +1))
  AUTEURS
             Yang, S.
  TITLE
            Direct Submission
            Submitted (22-DEC-2000) Immunology, Heska Corporation, 1613
  JOURNAL
             Prospect Parkway, Ft Collins, CO 80525, USA
FEATURES
                      Locati n/Qualifiers
                      1..610
     source
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                      FF CASEFMENTFELDYLQNFLAVINTEMTFES"
     وجنبي
                      177
BASE CORT
                                   1944 1 1914

    Sampitana martina att tradalotat gagaatiett otgaattiga gittigstags
elimenting grown from marrottiga ogtagagat medigara gastigtigtigs.

      [2] agagacetty acasty, tot coasteateg aasttygety Ataggegaty ygaacetgat
      181 gatteetact eetgaaqata aaaateacea aetgtgeatt aaagaagttt tteagggtat
      241 agacacatty aagaaccaaa ctgcccacgo ggaggotgtg gataaactat tccaaaactt
      301 gtctttaata aaagaacaca tagagegeea aaaaaaaagg tgtgeaggag aaagatggag
      3rl autgazadag tipotagast assignaagt alttoligt glaataaasa sogagtggas
      Anl ad Ijaan K thagaa saaa burusttaji gingiggaag atiitiggaga agaatggitt
      481 titumenatu anastuadun bhaa baaba utannuarii katuuncadi ataantaadr
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OMM Structure Hooks Search Nucleotide Go ▼ for Clear Limits Preview/Index History Clipboard Details File default Send to • Display ▼ <sub>Show:</sub> 1

## ☐ 1: AF331920. Canis familiaris ... [gi:15919182]

Links

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LOCUS
            AF331920
                                      468 bp
                                                DNA
                                                         linear
                                                                  MAM 04-OCT-2001
DEFINITION
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ACCESSION
            AF331920.1 GI:15/19182
VERSION
KEYWORDS
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            Hukaryota; Metado:; Chordata; Craniata; Vertebrata; Euteleostomi;
            Mammalia; Eutnéria; Carnivora; Fissipedia; Canidae; Canis.
FEFFERICE
            : (bases 1 to 46:)
            Yand, S., Cellins, F.S., Weber, F. and McCall, C.
  AUTHORS
            Canine interlaudin-5: molecular characterization of the gene and
  TITLE
            expression of hiologically active recombinant protein
  JCTEMAL
            J. Interferon Cytokine Res. 21 (6), 361-367 (2001)
             1334433
  MEDIINE:
   PUBLIFIE
             1440633
REFERENCE
            . (bases 1 to 465)
  AUTHORS
            Yar.q.S.
  TITLE
            Direct Submission
  JCUFIAL
            Submitted (22-18G-2000) Immunology, Heska Corporation, 1613
            Prospect Parkway, Ft Collins, CO 80525, USA
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                     KRCAGERWRVTKFLDYLQVFLGVINCEWTPES"
     3 * [17] [8]
                     437...468
PAGE COUNT
                          - 9 3
                                  110 1 117 1
PIGIN
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       \ell 1 tiggggoige claigithet geethigeig tagaaaatee eatgaataga eiggiggeag
      121 agacettgae actgetetee acteategaa ettggetgat aggegatggg aacetgatga
      181 ttcctactcc tgaaaataaa aatcaccaac tgtgcattaa agaagttttt cagggtatag
      241 acacattgaa qaaccaaact goocacqqqq aqqctqtqqa taaactattc caaaacttqt
      301 Mittaataad agaarasata gariporada adadaarrii tgcaggadaa agatggagar
      361 täulääägtt vitädantas staraadtat tthiitaatoi aataaanain daatoganan
```



# **NCBI Conserved Domain Summary**

PubMed

Nucleotide

Protein

Structure

Taxonomy

Help?

#### RPS-BLAST 2.2.5 [Nov-16-2002]

Query= 51 1 \*181 \* 70 Attil 156.1 Ar Glove\_1 interleukin-5 [Canis familiaris]

(134 letters)

Database: cdd.v1.60

10,013 PSSMs; 2,494,783 total columns

# Click on boxes for multiple alignments

Show Domain Relatives

.. This CD alignment includes 3D structure. To display structure, download Cn3D!

PSSMs producing significant alignments:

E Score value

(bits)

gnl CDD 8195

pfam02025, IL5, Interleukin 5

186

7e-49

• gnl CDD 8195, pfam02025, IL5, Interleukin 5.

CD-Length = 108 residues, 99.1% aligned Score = 186 bits (473), Expect = 7e-49

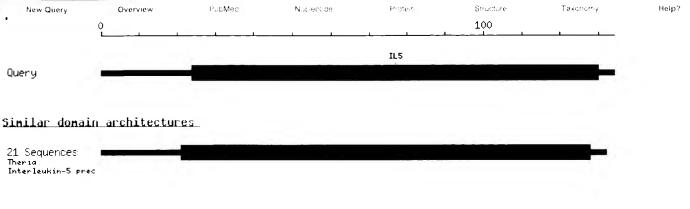
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Sbjct:	2	PMSALVKETLALE STHETLL CONETER OPVETHKNEGL CIEFIFQGIDTENNGTAQCGAV	61

DKLFQNLSLIKEH: ERQKKRUAGERWEVTKFLDYLQVFLGVINTEWT Query: 85 ETLEQNISLIKKYIDRQKKKOGEERRKVKQFLDYLQEFLGVINTEWT 108 Sbjct: 52

> Help | Disclaimer | Write to the Help Desk NCBI | NLM | NIH



# **CDART: Conserved Domain Architecture Retrieval Tool**



Result page: Previous 1 Next

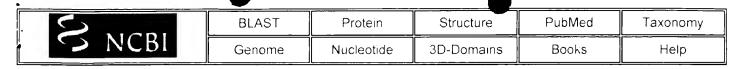
Subset by Taxonomy

**Subset** by selected domains:

pfum02025

Interleukin 5.

**Help** | Disclaimer | Write to the Help Desk NCBI | NLM | NIH



Query: gi|15919183 interleukin-5 [Canis familiaris] Matching gi: 15919181

Best hits	Common Tree	Taxonomy Report	3D structures	CDD-Search	GI list			
22 BLAST hits to 18 unique species Sort by taxonomy proximity								
1 Archaea	Bacteria <b>22</b> Me <u>ta</u>	azoa 🚺 Fungi 📵 Plants 🕡	Viruses Other E	ukary <u>ota</u> e				
Keep only		Cut-Off 100 Select	Reset					

13	4	aa

- <del>հավասհահավառիուհահանահահակահահահ</del>	SCORE F	ACCESSION	GI	PROTEIN DESCRIPTION
	591 23	AAC64505	32.78519	interleukin-5 [Felis catus]
	586 .13	AAC27616	3341392	interleukin 5 [Felis catus]
(Malaxana)	<u>573</u> .:1	<u> MB 383.13</u>	44043.1/	Interleukin 5 [Sis scrofa]
	<u>571</u> . 6	<u> </u>	<u> 5600: 4</u>	interleukin-5; IL-5 [Canis familiaris]
	<u>567</u> 21	AAB+13+1	<u> 1913334</u>	interleukin-5 [Equus caballus]
	<u>551</u> 21	<u> </u>	<u> 11131.11</u>	interleukin-5 [Bos taurus]
	536 01		89777	interleukin-5 [Cvis aries]
	468 . 3			interleukin-5 [Felis catus]
	<u>448</u> 21			interleukin-f [Saimiri sciureus]
	<u>430</u> 11			B cell differentiation factor I [Homo sapi
	429 . 1			interleukin f
	<u>425</u> 21			interleukin-5
	<u> </u>		22 F. H. N. 1. D.	B cell differentiation factor I [Homo sapi
	<u>413</u> . 1			interleukin-[Cavia porcellus]
	<u>385</u> .:1	WACL 1721		interleukin-5 [Sigmodon hispidus]
	386 21			interleukin 5
	<u>374</u> ::1			IL-5 [Mus musculus]
	<u>370</u> .:0	<u>AAD:1462</u>		interleukin-5 [Macropus eugenii]
	<u>359</u> .:1	CAA == 283		interleukin f [Fattus rattus]
	<u>352</u> .:1			interleukin-5 [Rattus norvegicus]
	<u>349</u> 21	<u>lHULA</u>		Chain A, Mol_id: 1; Mclecule: Interleukin-
	<u>108</u> 20	<u>AAD37461</u>	<u>500€324</u>	interleukin-5 [Sminthopsis macroura]